

AMENDMENT TO THE CLAIMS

1. (currently amended) A temperature regulated, enclosed intrinsically safe electrical energy storage cell pack for an intrinsically safe hand held portable instrument in an industrial process control system, comprising:

a plurality of electrical energy storage cells wherein the electrical energy storage cells are elongate and aligned parallel to one another and side by side;

a plurality of opposed alternating electrical interconnects arranged to electrically connect ends of adjacent pairs of electrical energy storage cells;

electrical leads which couple the plurality of electrical energy storage cells to the intrinsically safe hand held instrument;

a plurality of elongated separation bars positioned at the ends of pairs of adjacent electrical energy storage cells and between the plurality of electrical interconnects to thereby reduce shorting and provide mechanical support;

a plurality of opposed first and second half shells forming a plurality of half shell pairs, each half shell pair having a tubular shape and positioned in physical contact with opposing sides of one of the plurality of electrical storage cells, each half shell pair having a gap therebetween opposed adjacent edges of each half shell pair and extends along an axial length of each half shell pair to allow thermal expansion of the half shells during heating, the first and second half shells extending in parallel planes and enclosing the plurality of electrical energy storage cells, each half shell comprising an interior layer of thermally conductive material that is shaped to conform to a cylindrical portion of an outer surface of the electrical energy storage cells, the interior layer terminating at interior layer ends that are on the cylindrical portion of the outer surface of the electrical energy storage cells, and the interior layer having a first thickness and a first value of thermal conductivity;

a plurality of outer elastic layers extending around pairs of opposed first and second half shells configured to hold pairs of first and second half shells against a respective

energy storage cell, the plurality of outer elastic layers of a thermally insulating material having a thermal conductivity which is less than the thermal conductivity of the ~~inner~~-interior layer, wherein the outer layers define an exterior surface of the enclosure of the electrical energy storage cell which separates the electrical energy storage cell from the explosive environment, the outer layers having a second thickness and a second value of thermal conductivity; and the first and second thicknesses and the first and second values of thermal conductivity conforming the enclosed electrical energy storage cells to a combustible atmosphere temperature classification that specifies an outer surface temperature during an electrical short circuit of an electrical energy storage cell, the enclosure controlling the outer surface temperature of the combined enclosure and electrical energy storage cells such that the temperature regulated, enclosed electrical energy storage cell pack comprises intrinsically safe equipment in the explosive environment;

a protective device including a fusible link coupled to a connected lead and the electrical storage cells which is encased in potting compound;

an outer shell covering the plurality of electrical energy storage cells and coupled to the plurality of elongate ~~separate-ion-separation~~ bars wherein the plurality of elongate ~~separate-separation~~ bars extend from the outer shell and slide between the electrical ~~outer-connects~~-interconnects and the ends of pairs of adjacent electrical energy storage cells; and

wherein an exterior temperature of the outer layer is less than 130°C during the electrical short circuit of the electrical energy storage cell; and

wherein the protective device is positioned within the outer shell and adjacent an end of one of the plurality of electrical energy storage cells.

2. (previously presented) The temperature regulated, enclosed electrical energy storage cell pack of Claim 1 wherein the electrical energy storage cell produces heat at a hot spot during the short

circuit and the interior layer of material spreads flow of the heat over a portion of the outer surface of the interior layer that is larger than the hot spot and the outer layer of material retards flow of the heat to an outer surface of the outer layer.

3. (previously presented) The temperature regulated, enclosed electrical energy storage cell pack of Claim 1 wherein the temperature of the outer surface of the outer layers has a measured maximum temperature of 130 degrees centigrade or less during the short circuit condition.

4. (previously presented) The temperature regulated, enclosed electrical energy storage cell pack of Claim 1 wherein the interior layer of material comprises aluminum.

5. (previously presented) The temperature regulated, enclosed electrical energy storage cell pack of Claim 1 wherein the interior layer of material comprises copper.

6. (previously presented) The temperature regulated, enclosed electrical energy storage cell pack of Claim 1 wherein the outer layers comprise heat-shrink tubing.

7. (cancelled)

8. (cancelled)

Claims 9-35. (canceled)